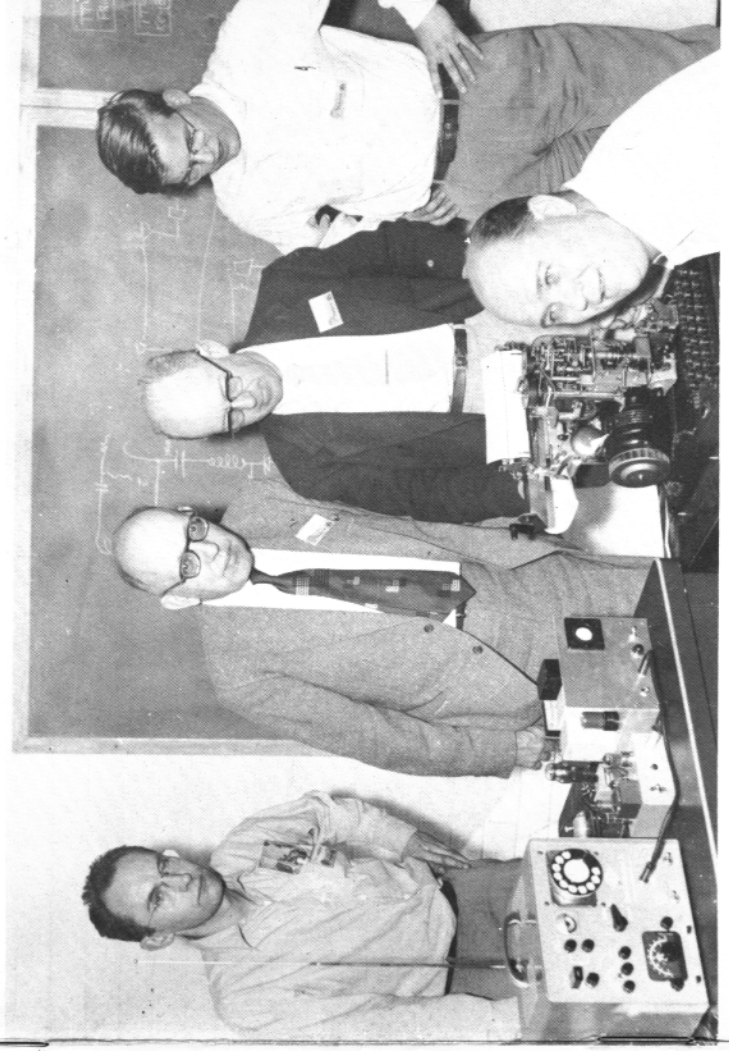
RTTY

NEWS OF AMATEUR RTTY

AUGUST, 1956
25 Cents
Vol. 4, No. 8



FRESNO HAMFEST

W6MTJ, W6HC (Pac. Div. Director), W6CBF, W6INY, W6FDJ

HORSE TRADES

This page of the Bulletin is for use of amateurs who have RTTY EQUIPMENT FOR SALE OR TRADE and those looking for equipment to buy or trade. It is a free service and may be the means of getting someone on the air.

For Sale—Model 12 with table and cover, less keyboard, Model 15 keyboard with AC motor in one unit, Also Model 21-A printer W9HKA

FOR SALE—12,000 ohm d. p. d. t. 110v dc relays, Telewrite Receiving Converters, Miscellaneous Teletype equipment, FrA Converters W1AFN

Wanted—Model 14 type equipment ..... WØHFU & WØLFI

For Sale—Model MDX (mux td) Manuals W6NCO

FOR SALE—Model 12 Typing Perf., set Vac. tube.... W6ZNU

For Sale—Model 26's w/tables W6SCQ-W6VPC-W9GRW

For Sale—Bound Volume No. 3 RTTY (1955) $5.00 .... RTTY

For Sale—Model 0-73/URT FSK Exciter - manual .. W6PZV

WANTED—Base for Model 15 teletype.....W5TAF

WANTED—A.C. sync motor for Model 12.....W7JFU

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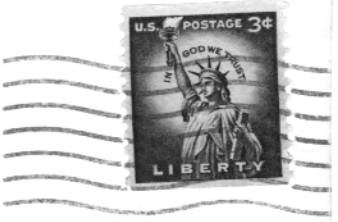

AN AMATEUR RTTY SYSTEM

BY DAVE E. CHAPMAN, W9DPY, LOMBARD, ILL.

In order to cover the entire system the following articles describing an approach to a very usable Amateur Radio Teletype system has been prepared. It will cover the following:

Part 1—One approach to an amateur RTTY system.

Part 2—A receiving terminal unit using a two channel filter constructed from a single FL-5, range filter.

Part 3—An extremely stable VFO for FSK on 80-40-20 meters, combined with an AFSK unit.

PART ONE
System Considerations

In my case the following system considerations were most important:

1. System must work well.
2. Cost must be low compared to other units
3. As little work as possible.
4. Model 26 RTTY machine.
5. Machine keyboard and printer not to be separated allowing a single pair of wires and one plug will carry all signal circuits.
6. Must print from own transmissions.
7. No relays to produce hash on receive.
8. FSK and AFSK oscillators to be keyed with low voltage to reduce radio noise.
9. Must have shift for 80-40-20 meters. (Since my transmitter has built in multipliers output of VFO stays on 80).
10. All equipment rack mounted.
11. Must be extremely stable.
12. Terminal Unit must work on 2125 and 2975 cycles to be used on both FSK and AFSK transmissions.
13. Material should be easily available.

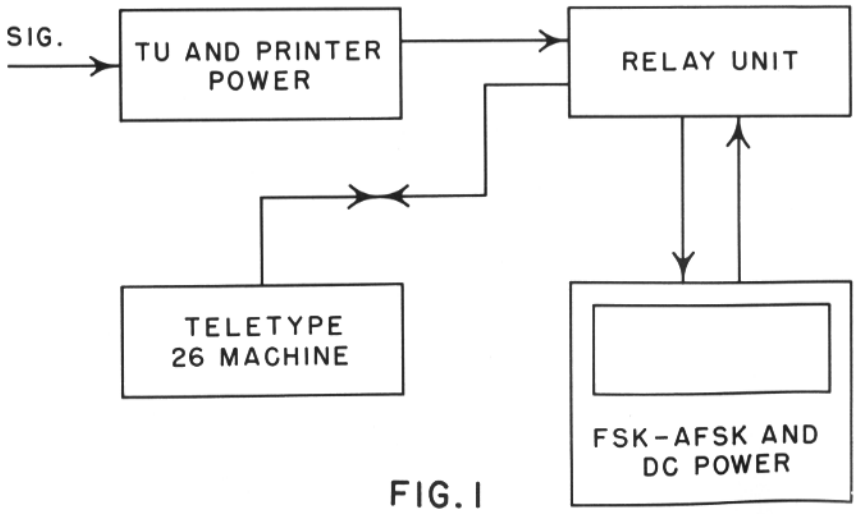

FIG. 1

The anaysis of these items would take up space that can be put to better use. Let us then go directly inta the design of such a system.

Figure 1 shows a block diagram of the general arrangement that would meet these requirements. It is apparent from the first glance that the Relay unit, standard Bell system Polar Relays

In selecting the relays for the relay unit standard, Bell system Polar Relays were available. They have one disadvantage—that is they require a polarizing current. However since the FSK unit has 6V DC available for the diode keyer this is no problem. (Some of the high speed Sigma Relays could be used without the required DC.

The entire relay unit was built on a standard aluminum relay rack panel, with the terminals on the rear and the relays accessible from the front. See Fig. 3 for a general sketch.

Three switches were used. They are bat handled toggle switches with the center position off. The first one in the up position places the relay operate coils in series with the TTY machine, in the center cuts off coil current completely and in the down position lets all the Terminal unit current go thru the TTY machine. The second switch controls the polarity of keying for the FSK oscillator up being mark low, center is off and down being Mark high. The third switch does the same for the AFSK oscillator.

Circuit of relay unit. The circuit of the relay unit is as shown in Fig. 2 Power for the printer comes from the Gates type TU and also the power for the operate coils of the polar relays. Two 6V DC sources from a common supply come from the FSK unit—one is filtered for the shift voltage. (This prevents undue FM from ripple on the diode modulators). Then as the typing unit is used, the relays in series with the keyboard operate the FSK and AFSK oscillators from current supplied by the TU.

Series jacks on the Relay unit are used to monitor coil current on the TTY machine. In my case this runs 25-30 ma. maximum.

Other arrangements and modifications will suggest themselves to the individual user. Example: permanent mounting of the coil current meter in the relay unit.

PART TWO
A Receiving Terminal Unit Using a Two-Channel Filter Constructed from a Single FL 5 Range Filter

One of the simplest TU's has been the "Gates" described in RTTY. Constructing this unit confirmed the excellent work done by the authors. The constants given were very good but some revisions were made necessary by using polar relays in series with the printer coil of the 26 machine.

The driver tube was changed to a 6Y6-GT to furnish the added power required by the polar relays. This tube has a high mutual conductance and gives a greater proportionate current change for a given grid change than the 6V6 or the 6K6. A circuit of the TU is shown in Fig. 4. Components are not critical with the exception of the filter unit. Pictures of the top and bottom of the TU show the simple construction. Two other changes besides the 6Y6 are noted. The coupling condensers in the last 6SL7

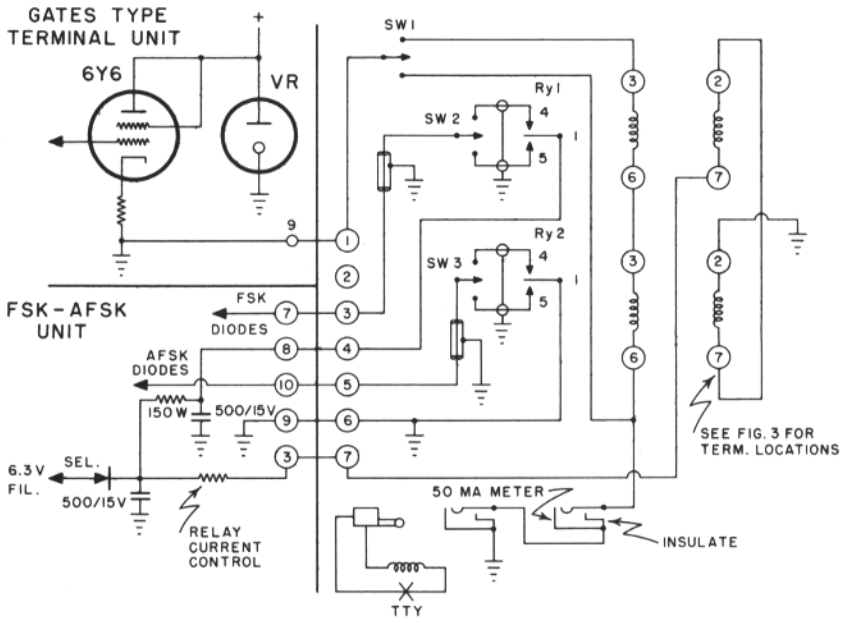

FIG. 2

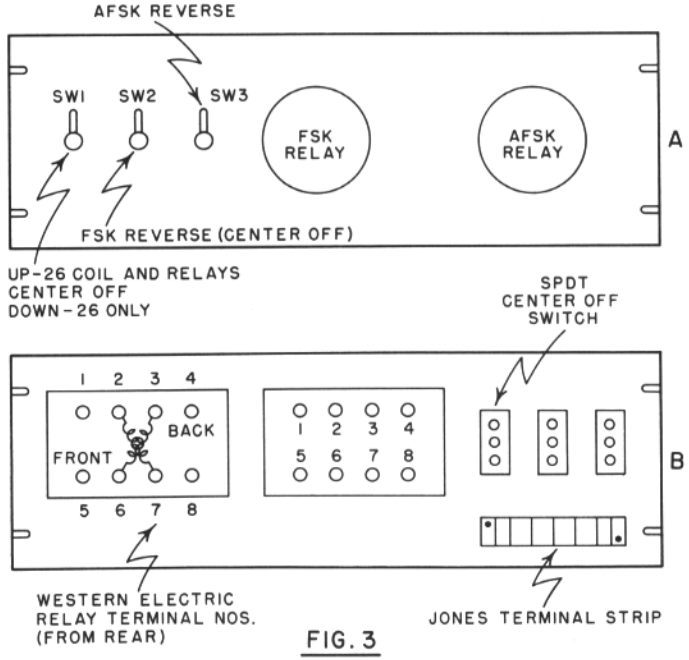

FIG. 3

were increased. The new values are circled. Increasing the capacity improved the low frequency response and reduced misprints in occassional longer intervals. Also the auto start was left off, but can be added if desired.

In order to improve versatility and reduce cost, no "line to tube" input transformer is used. The TU works equally well from the headphone jack of a Collins 75A3 (500 ohm nominal) or the headphone jack of an SX-71 high impedance jack.

Gain in the two chanels (2125-2975 cycles) should be equal. The individual channel gain is controlled by C3 and in most cases will need experimental adjustment. In my 75A3 the 2975 channel was about 6 db down. Other make sets seem to be closer in gain.

For most beginners the filter seems to be the greatest obstacle. Having worked for Airadio who made the FL-5 filters, several old units were lying around.

These units have an E core with the I lamination turned on their sides. A screw extending thru the diecast mounting moves the I laminations and varies the coil inductance — an excellent arrangement for our use.

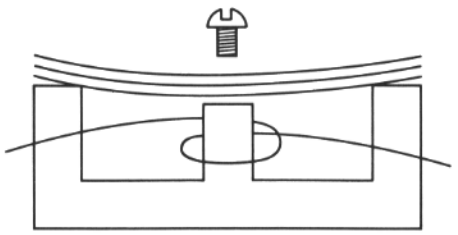

FIG. 5

On investigation, a reasonant two section filter offered good possibilities. Also coupling can be controlled capacitively and not require interlocked mechanical arrangements.

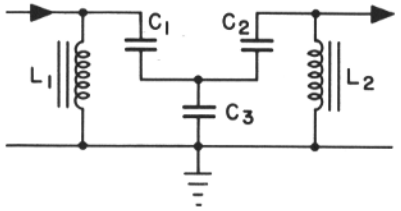

FIG. 6

L1, C1 and L2 C2 reasonate to the channel used. C3 is adjustable. (Larger C, lower coupling, sharper, lower gain and is used to balance channel gain).

A discussion of the theory involved can be found in several texts:

1.—F. E. Terman Radio Engineering, P 86 (2nd edition).

2.—Henney Radio Engineering Handbook, P 144-149 (3rd Edition).

Examining the FL-5 we find the original circuit required 6 coils, which were mounted as in Fig. 6.

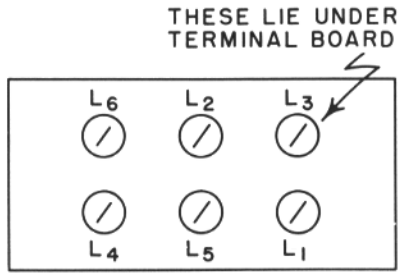

FIG. 7
TOP VIEW FL-5

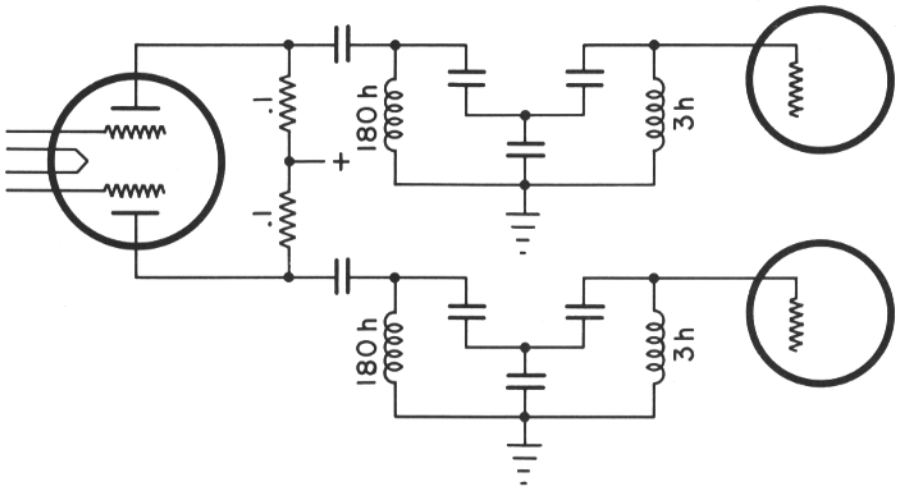

FIG. 8

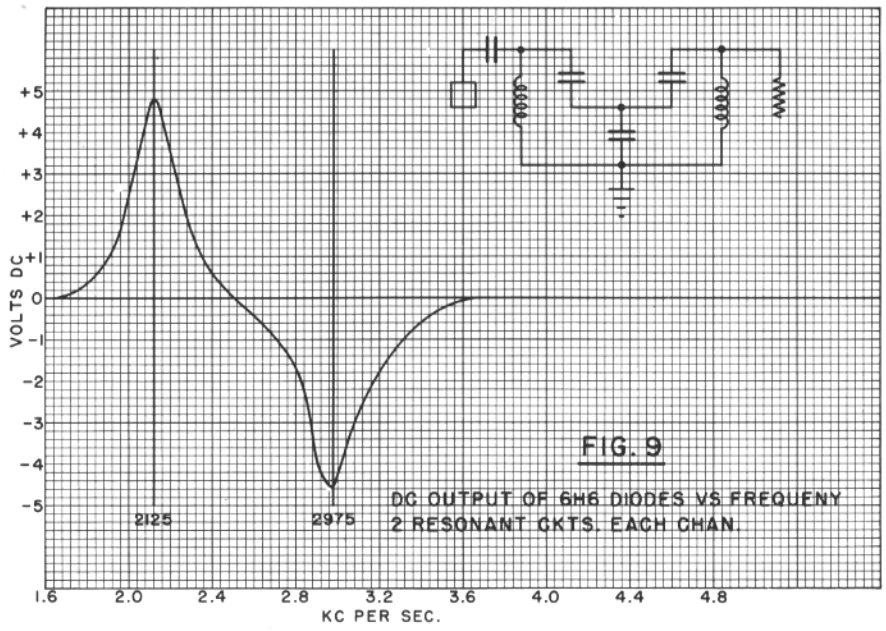

FIG. 9

DC OUTPUT OF 6H6 DIODES VS FREQUENY
2 RESONANT CKTS. EACH CHAN.

TABLE 1

In the FL-5 tested the following values were found:

(Nat position of coils may vary with different runs).

COIL	DC Ohms	Min. L at 1000 cps
L1	125	3.0 hy
L2	240	
L3	125	3.0 hy
L4	70	180 mhy
L5	180	
L6	80	180 mhy

Actual preparation of the FL-5 is to take out the top terminal board, take off the front name plate and cover and underneath (if used) being careful not to pull out the wires, bake out wax in an oven (be sure to catch the wax in something or the XYL will be more than anti-RTTY.

The constants given for the filter seem very stable. As pointed out, C1 and C2 reasonate. The smaller the condenser the higher the L of the associated coil, for a given frequency. Unfortunately, as the I lamination is bent to increase coil induction the iron loss goes up fast and the Q falls rapidly. It is better to use as much C1 and C2 as possible. Also some detuning of the reasonate circuit with changing signal level is noted. Larger C reduces the detuning.

Looking at L1-L3 and L4-L6 it is seen that these are similar Coils. Farther if we use 6SL7's in this circuit we have a complete filter from a single FL-5.

Since the plate of the 6SL7 shunts the coil, the lower impedance was used here (180 mhy) and for maximum selectivity the 3 hy coils are used in the grid of the 6SL7's

Figure 9 shows an overall curve of the DC output of the discriminator measured on a VTVM. (If you have no VTVM don't let that bother you—this filter lines up nicely with a Simpson 260 (2, 000 ohms per volt across each 470 K diode load resistor to ground).

Admittedly this is not as sharp as a torroid would be but is is ample for general amateur use.

After you have the TU finished feed 2125 cycles into the TU. Set mark-space switch to both. Reduce the input until there is no possibility of overload (this can be done with the volume control on the TU). Align both 2125 coils for max output on the diode load.

Now change to 2975 cycles and repeat. The meter does not need to be moved — just change the diode reversing switch. Note that at some point in the operation the second half of the diode load should be checked for balance.

This is done by alternately applying 2125 and 2975 cycles to the input, making sure the voltage is constant in each case, and measuring the voltage across the diode loads. It is wise to change C3 slightly for uniform gain if there is any great difference as this difference greatly determines the noise immunity.

Only a word about construction as all experimenters and builders have systems they prefer over others. I use a 1x1x1/16-in. aluminum angles on 17-in. wide chassis, mounting them vertically in a rack, then mounting the front panel independently. See Fig. 10.

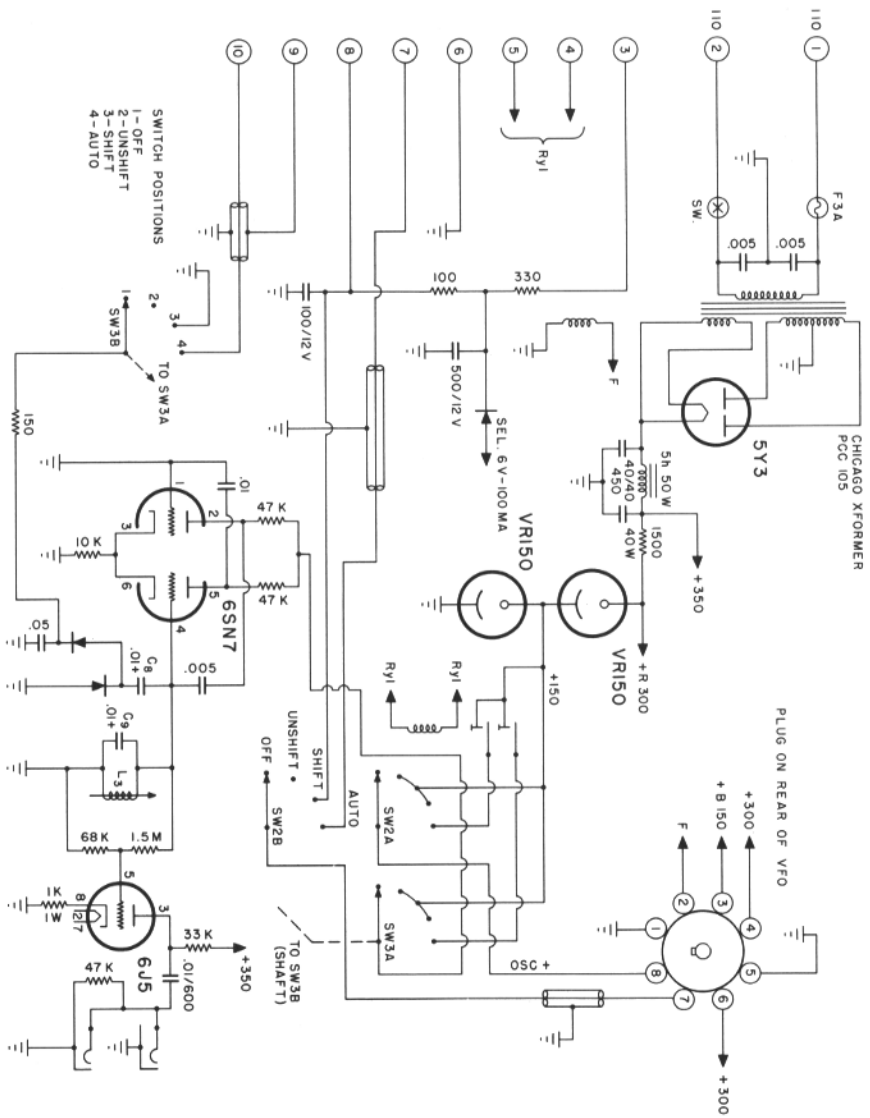

FIG. 3-2 AFSK AND VFO POWER

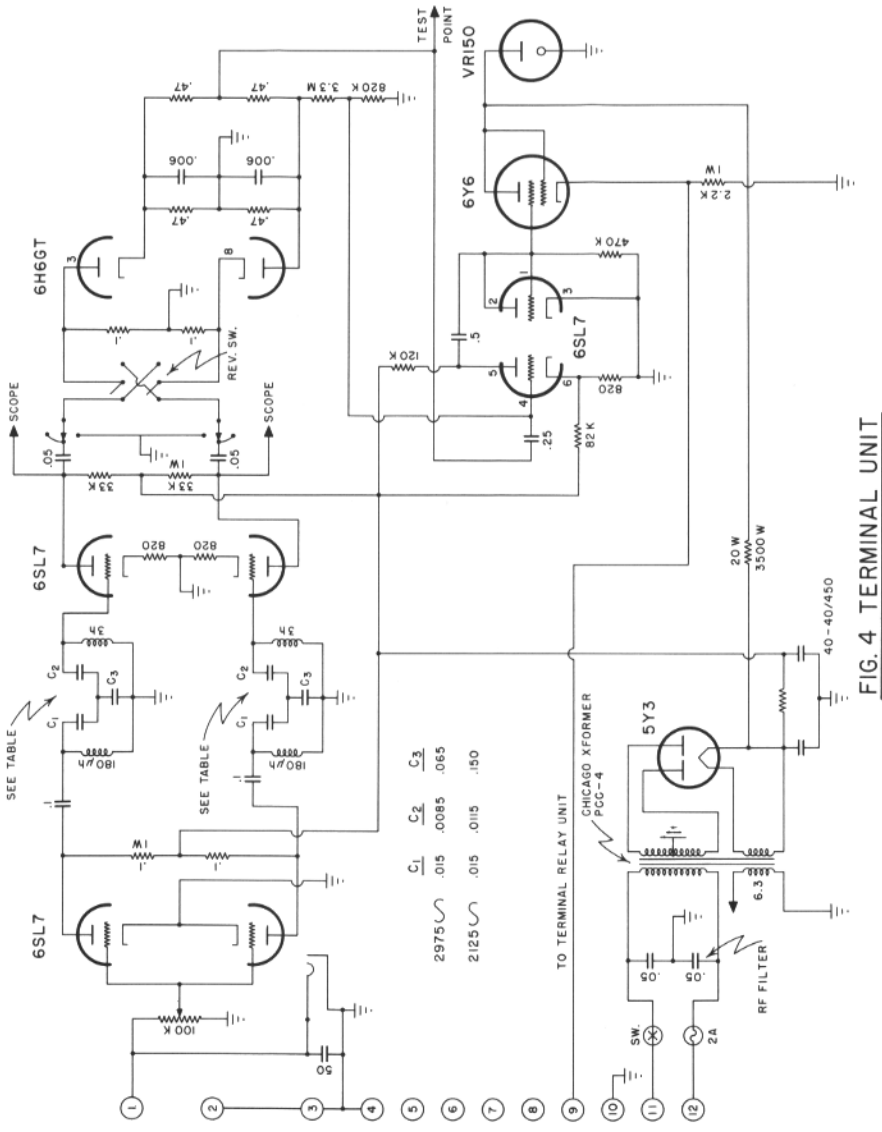

FIG. 4 TERMINAL UNIT

Mounting the chassis vertically allows work on the TU without taking the unit out of service or unfastening any leads.

In an assembly of this type I use terminal strips available in surplus and mount them like Fig. 11.

Bare tinned copper wire with sleeving works faster and easier than stripping insulated. If a few extra points are allowed on the terminal strips a real quick neat easy job results.

As a final parting word, I always use RF filters and fuses on the AC line. The filters reduce the amount of feedback troubles from RF and several times in the last 25 years the fuses have saved me costly fires and equipment loses.

PART THREE
An Extremely Stable VFO for FSK on 80-40-20 Meters combined with an AFSK Unit

In the two previous parts an amateur RTTY system and a receiving terminal unit were discussed. In this part a combined FSK-AFSK unit is described. The major portion of the system operation lies in this unit as it supplies bias voltage for the polar relays and keying voltage for the FSK oscillator. The AFSK oscillator is keyed with crystal diodes that require no voltage. This unit has a fixed output, although a variable output could be provided with the addition of one pot.

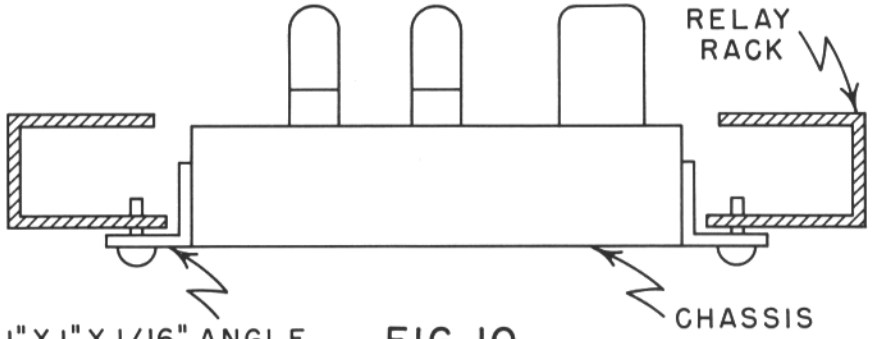

FIG. 10

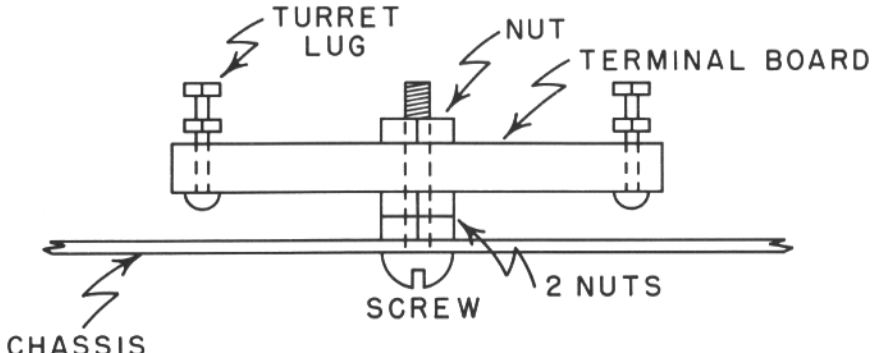

FIG. 11

FSK CIRCUIT

The circuit of the FSK unit proper is shown in Fig. 3-1. So much development was done that it is not feasible to give a detailed description here.

To get good isolation the oscillator is operated on 160 meters, doubling to 80 in the plate of the same tube. This prevents stray chassis currents reacting on the oscillator — an almost impossible thing to clean up any other way. The oscillator is a shunt tuned Colpits, similar to that used in a Collins ART-13. A discussion of the oscillator stability factors is found in a recnt issue of CQ. The oscillator is followed by a 6AG7 straight thru amplifier and then an 802 power output tube. The unit develops about 3 watts on 80 meters.

Large condensers were used across the oscillator to reduce incidental drift and temperature compensation was used. It is suggested in making the unit the constructor buy 4-10 mmf and 2-5 units and use only that necessary to correct for drift.

Since my transmitter had multiplier stages it was unnecessary to build them in the VFO. If multiplier stages are necessary a look at the Johnson Ranger circuitry and construction will show how to do the job.

PHYSICAL CONSTRUCTION

An old 40 meter 274-N transmitter was ripped down and used as the basis of the VFO. The oscillator coil was removed but the tuning and padder condensers were left in place. The temperature compensating condenser was also removed. The oscillator coil slug was removed from the top cover but the amplifier coil tuning slug left in place, as well as the amplifier coil. No special details are necessary except that the slug used in tracking the oscillator coil was temperature sensitive and caused several weeks work before being located. The Oscillator slug must be pulled out and discarded. Also use only silver micas in the oscillator circuit.

For reason of dial coverage the oscillator coil was taken from an 80 meter ARC 5 (or 274-N). To reach the 1750 kc end the coil was stripped completely and rewond full of bare tinned copper wire, same size as the original.

A Cambridge Thermionic coil was used in the 6AG7 plate. With the resistor used it tunes broadly, and the original adjustment can be made with a grid dipper.

The 40 meter plate coil of the 274-N transmitter was not changed, but the antenna load coil, relay, etc. were removed, then a .0001-5000V test mica condenser was placed across the tuned circuit, reducing the circuit impedance and allowing partial tracking of the circuit to 80 meters. (This is the 802 plate).

With the oscillator constants given, the output of the VFO is 3500-3760 kc. If you need a "universal" VFO from the same unit, it is only necessary to increase the inductance of the Oscillator coil and

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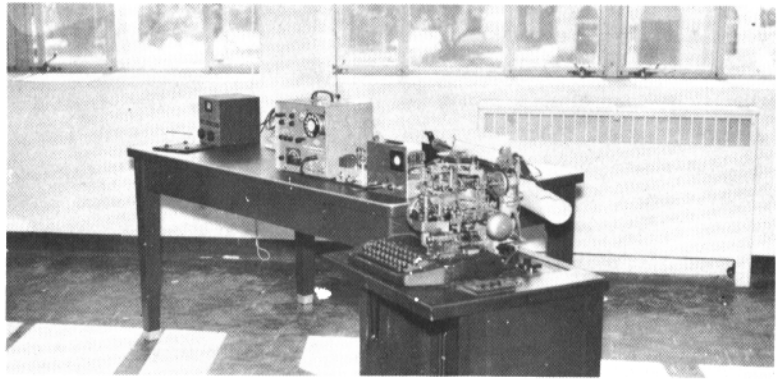
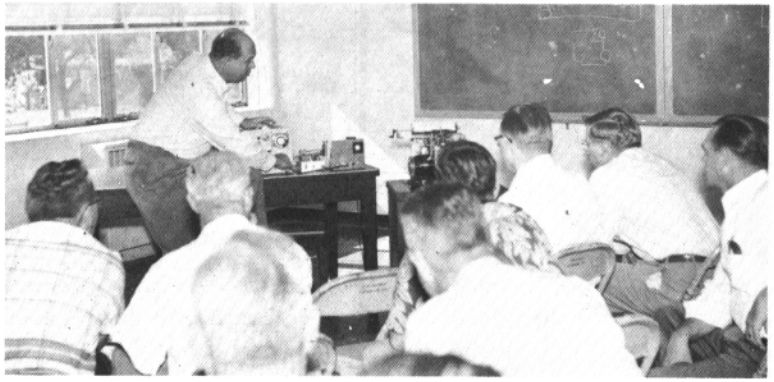


Model 26 and 2 meter gear used in demonstration of two AFSK 2 Meter stations at Fresno Hamfest



Roger Wixson, W6FDJ, Explaining RTTY AFSK Equipment at Fresno Hamfest

reduce the shunt capacity (micas) and it will cover the entire 80 meter band.

KEYING

A diode keyer with high back resistance diodes is used. The filters in the diodes may seem large, but they were necessary to reduce "side clatter." A switch is provided to select 3 different amounts of shift, allowing the same VFO to be used on 20-40-80.

6 Volts DC from a selenium rectifier and filter are applied to the FSK diodes thru one of the polar relays. A reversing switch is provided to allow either mark high or mark low. (This is described in the first part of this article).

The frequency shift condensers are NPO and the condensers shunting them are maximum positive compensation, to compensate for diode drift during warm up. A charge of less than 50 cycles in shift should be noted on 20 meters for a 4 hour warm up period. Most of this occurs in the first 15 minutes and depends on how good the diodes are.

Moderate RF filtering of all leads was used and no other TVI precautions were necessary.

CONSTRUCTION

A 12x17x3 chassis was used and a "door" type front panel. Three switches and two jacks were mounted below the door. The first is an off-on, the second and third control the FSK and AFSK oscillators. They both have four positions and arranged as follows:

Position 1—Off.

Position 2—Unshift.

Position 3—Shift.

Position 4—Automatic. (Comes on when the transmitter is on and keys with keyboard).

In addition, line fuses and RF filters are used. A relay operated from the main transmit bus (117V AC) turns either or both oscillators on and off with the transmitter circuits.

CW keying can be in the cathode of the 6AG7 and leads are brought out on the power plug. In my case this is not used and I key in the exciter section of the main transmitter.

The two jacks are audio output from the AFSK oscillator and can be fed to the Magnecord for a permanent record or to the speech amplifier for 2 or 11 meter AFSK.

Terminal boards are used where possible. Low voltages are used on all possible tubes to reduce drift and increase stability.

External connections are to terminal strips.

Most wiring was done with bare wire. Spaghetti was used where insulation was necessary.

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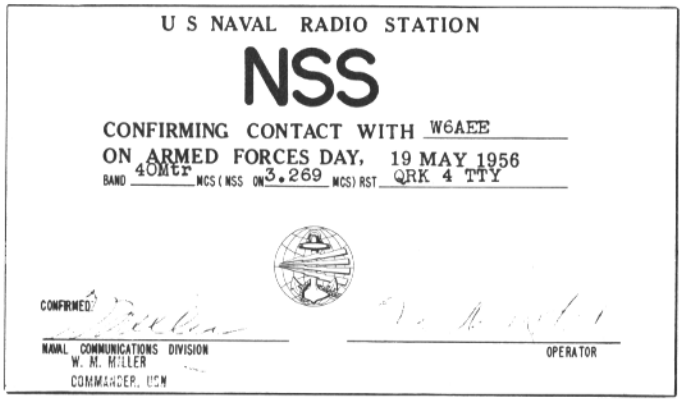

U S NAVAL RADIO STATION

NSS

CONFIRMING CONTACT WITH W6AEE

ON ARMED FORCES DAY, 19 MAY 1956

BAND 40Mtr MCS (NSS ON 3.269 MCS) RST QRK 4 TTY

CONFIRMED

NAVAL COMMUNICATIONS DIVISION
W. M. MILLER
COMMANDER, USN

OPERATOR

Results of the Armed Forces Radioteletype contacts and special broadcast.

An increase in participation occured this year as the following totals will attest. Thirty-five amateurs made radioteletype contact with NSS on 40 and 80 meters as follows: (2) indicates contact on both 40 and 80 meters

W1AW	W2KYN	W8DVL
W1BDI	W2PBG	W8SWZ
W1BGW (2)	W2RTW	W9GRW
W1FGL (2)	W2VLL	W9TCJ (2)
K1NAI	W3FYZ	W9NOE
W1RBF	W3KYR	W9VOK
W1CWG	W6AEE	W9WMR (2)
W2JAV (2)	W6EDJ	WØBP (2)
K2HHJ	W6WIS	WØFQW (2)
		VE3BAD

One hundred fifty-nine individuals copied the radioteletype message broadcast by the Army, Navy and Air Force. One hundred five of these individuals submitted perfect copies. ((2) indicates submitted copies to two services).

W1: BDI (2), CLF, RBF (2), WEW, WPR, ZQM: W2: DOB, DXD (2), GHH, HHJ, JAV (2), OEM, RMB: W3: CRO, FYZ (2), LWQ, MHD, PYW, SSL, YKF, YMA, YRB: W4: AIY, FJ, HNF, IUQ, NRY, OXX (2), PFO, PHL: W5: DGZ, EVO, JBW, TJE, VJP, WAH, YMT: W6: AEE, AJH, ASJ, BRY, BYS, CAP, CBF, CBX, CG, CLW, CNH, CQI, DNT, DNX, DOW, EER, EGZ (2), EJM, FCX, FSL, FZC, HXQ, ILW, IZJ (2), JJP, LFK, MSG, NR (2), NSS, NYF, OGG, OUR, OVZ, OWP, PGP, PYM (2), RSJ, SCK, SCR, VPC, VVF, YDK, ZGC: W7: CSC, FCN, IXD, JFU, KQX, KWB, NAA: W8: BNL, GPR, HWP, SWZ: W9: GRW, GVN, IHO, OCV, TCJ, VNZ, VVF, ZBK: WØ: BLH, CTH/6, CST, FQW, IPQ, JHS, LFH, LHP, UPE: VE3BAD.

No Call Signs: John F. Duran, J. Halapoff, Greg. F. Rose, Joseph W. Stevens, J. E. Blanchett, J. J. Duran, Don W. West, Thomas R. DeLuca, Richard P. Stauffer, Dean J. Frazer, G. M. Hilton, Jr., G. E. Booth, Kenneth Gray, N. A. Partridge, C. W. Chrisholm, A. L. Charlton, R. M. Todd, N. D. Rosenberg, F. C. White, K. W. Tuskind, W. T. Phillips, Jr., T. A. Myers, Dougles H. Fox, M. H. Caldwell, Jr.

We appreciate your interest in military radio activities and hope that the above information will be of interest to your readers.

Sincerely yours,

Willard Flint, Major, Signal Corps
Chief, Military Affiliate Radio System

On April 20, 1956 at 6:30 p. m., the Northern California Society of RTTY (this name is being used until something permanent is decided upon) started gathering for a social and scientific evening. A social half-hour preceded an excellent dinner, enjoyed by the thirty-five participants.

After dinner, Rog Wixson, W6FDJ, discussed methods of producing FSK in VFO units as commonly employed by the majority of amateurs. Discussion was made of upside down and right side up keying and the slogan "LSMFT" was mentioned as a means of remembering the normal, or right side up, shifting—Low Space Means Fine Teletyping. Schematics which Rog had prepared for the occasion were distributed showing the common type of shift circuit using the capacity reastance in the shift circuit which requires the use of a polar relay to produce right side up keying. Compared with this was a circuit using inductive ractance to produce frequency shift keying which eliminates the need of a polar relay and allows keying of the oscillator circuit directly with the keyboard contacts of the Teletype.

Bob Unsworth, W6MTJ, discussed a condition of distortion which shows up on cam-type distributors employed on Model 26, 15, 14 and 12, when contacts are misadjusted. He displayed a means of eliminating this trouble by use of an adjustable back-stop assembly on the keyboard contacts.

Rog. Bunce, W6EFT, gave an interesting talk on "An Electronic Keyer and Audio Oscillator." He had prepared a very thorough paper and copies were presented to everyone at the meetng to follow along with the talk which consisted of a discussion of a means of keying an AFSK oscillator by means of the voltage developed across the selector magnet in the cathode circuit of the usual keyer tube employed in the average converter.

A brief period of questions and answers followed and then the subject of forming a formal Northern California Teletype organization was brought up. It was mentioned that the Southern California Organization (RTTY) has offered to either allow us to use their by-laws as a model for purposes of incorporation or we can actually join the Southern California organization. An alternative was suggested—most of those present felt that for the time being the group should meet only on an informal basis; however, this issue will be discussed further during the next meeting, in June. This meeting will very likely be held on the East side of the Bay.

Three door prizes were given away — a Robert Dollar Field Strength Meter, a Weller Soldering Kit and an Adjustable

Backstop Assembly for the Model 26. Also, a drawing was held and an AFSK Oscillator and Converter unit was loaned by Rog Bunce to assist a "newcomer." This unit is to be loaned for two months at a time and will be passed on every two months to someone who actually needs it to get started.

Particular mention was made of the generous, unselfish and untiring efforts of Herb Hoover, Jr., W6ZH, and Merrill Swan, W6AEE, in procuring TTY machines for hams. Their efforts are certainly appreciated by all teletap-happy amateurs.

Those present

W6VPC	W6RN	K6GZ
and XYL	W6NYO	W6WIS
W6EFT	W6CBF	W6GDO
W6FDJ	K6BAO	K6HHD
W6AHH	W6OWQ	K6HIO
and XYL	W6NEQ	W6DNX
W6FQE	W6RMM	and XYL
and XYL	W6UQ	W6MTJ
K6EJM	W6ACN	W6LFF
W6NKP	W6FZC	W6ASJ
W6FG	W6FSL	and XYL
W6CJY	W6IBE	

———RYRYRY——

Havent written you since the Armed Forces day fracas. Boy what a workout that was. As I mentioned to you, I took over my own converter—with the filters you tuned up for me—and Collins 75A3 receiver with mechanical filter. They had a special TTY receiver and RCA audio (discriminator type) converter. I believe the converter wa son AN/URA 8-A.

It certainly was too bad that we only had a 3 mc frequency to transmit with. I am sure they will give us a 7 and 14 next year—at least they are giving it serious consideration.

I wanted to let you know how many fellows on both 40 and 80—Beep, Phil, Bob (9TCJ) and many others, and as I recall I worked fifty odd contacts during the six hour period. Didnt hear a single fellow on 14 mc.

We were using a TDH—very similar transmitter to the one used by VE7KX. It was running about 3 KW input into a rhombic pointed west with legs about 1000 feet long. This is not much of an antenna for 80 meters, but is is the "standard" Navy rhombic and the best they could do.

During a portion of the period we had several troubles. The first one was a confounded thunderstorm that drifted by the station about 9 P. M. It banged and crashed away and gave me the "usual" trouble with copy. Then about ten thirty EST the space signal went to pot. I heard the NERK broadcast breaking it up. This meant that the channel they had us on on the control link to Annapodlis (where the transmitters are) was getting mixed up with another circuit. It took them about half an hour to fix that and in the meantime some of the east coast boys hit the sack. As you know, Bob W9TCJ, was re-transmitting me on about 7140. Wonder if you copied me on 7140 or the 3 mc. freq. I worked full duplex with Bob for several minutes at a time. It is lots of fun, two printers at each end. I was sending on a Model 19 and receiving on a Model 15. Bob was sending on his 26 and receiving on his 14, typing reperforator.

The receiving location, where we were situated, is about twenty miles south east of Washington. It is out on the Maryland eastern shore and covers acres and acres. Just lots of antennas—a veritable "farm" as you have heard them called. Both radio control and wires run from this location back to the Navy at the Pentagon and the old "Main Navy" building on 17th Street. Both radio and wire control run from the receiving location down to Annapolis where the big multi KW low frequency (15-16) kc) rig is located together with all the LF and HF gear, similar to the rig I was using. I asked for 50 kw for the TTY broadcast but they couldn't spare one. Maybe next year, eh?

I certainly do appreciate your passing the word to the boys on the west coast about the shindig. I worked my buddy Ken W6WIS, Bob W6MTJ, and you. I seem to recall one other, but maybe I am wrong about that. I meant to write down who I had worked but by the time I finished up and got my gear stowed in my car it was about two a. m. and I teach Sunday school at 9 a. m. and had a 50 mile drive back home.

I received the filters fine, and sure do thank you. I cant for the life of me imagine what the difference is between how you check and I do The space measures at 2550 and the mark at 2075. So I sent them to Louie (6SCQ). I just dont have the heart to bother you any more. Let's let Louie worry about the dern things. I'll be darned if I know how you get the core to slide together and open up so the units can be tuned. You darned genius!"

Regards,

—Frank

TO ALL RADIO AMATEURS:

Nr. 21—from W6VPC, Oakland, Calif.

Call attention to the following Army MARS RTTY Nets operating in the 6th Army:

A6FZC/B on Two meters, 148.01 at 9:00 p. m. PST each Tuesday night.

A6VPC/B on 3245 kc. at 9:00 p. m. each Wednesday night.

All making copy of either of these two Nets are invited to drop the above named stations a card advising as to reception in your area. —BT. AR.

———RYRYRY——

Got a chuckle out of the RTTY column this month Byron. One hour before I got my copy of CQ I was advised of the availability of 34 Model 14 keyboard-printers complete and then received CQ which said they were scarce! You were plenty correct thought. They have been scarce between periods of plenty. The telephone companies keep telling me they are scraping the "bottom of the barrel" on the 26-Type machines and then one of them will come along with another dozen or two. 5 complete Model 26 machines from one of the independent companies (with whom we only have a verbal agreement) with tables for $30 each! That is five bucks better than the first batch. The Bell companies ask anywhere from $35 to $65 bucks depending on the companies. 8 more Model 100 machines but none for release as there is a waiting-list of ten for these, so will not "Bulletinize" them. Negotiating with an export firm to handle shipment overseas of printers, including export crating. Have large number of requests for machines which, originally I refused (because I thought it wrong to

keep an American Ham waiting to furnish foreign one) but now that machines are becoming more plentiful (for the present few months anyway) I have accepted these requests. This cold place warming up as I type. The transmitter draws 20 amps total input from line and most of that just warms the shack with the usual W2BFD efficiency. You are probably finding the signal a bit better these days. Upped the power to 450 watts. Don't like to run 600 because it has a tendency to run away on the grid current on final. Okay for short transmissions up to abut 10 minutes. Don't mean to give you such long ones but only get one whack at sending per day and this has to be "IT." Making tape of this to rerun later or tomorrow. Got your acknowledgement for my other long tape, by the way. We'll se you later Byron. Will try to get up here some evening so I can get in on these ragchews. Glad to see Jersey coming to life. W2 JTP de W2BFD. Off and Clear.

———RYRYRY——

"Well, for a roundup of RTTY stations (and possible RTTY stations) that I visited during this 4500 mile drive:

From Wisconsin, down south to Fort Worth and visited W5HZF, showed him some of the gear, and discussed plans for narrow FSK and auto start and Fax. Westward to Fort Davis, Texas. Operated W9TCJ/5 at McDonald Observatory for a week or so. Worked mostly W5's, W6's. Apparently excellent reception conditions. Then westward Ho! to California. At W6AEE's place during the Contest period. Then down to Santa Ana (my boyhood stomping grounds) to see relatives and old friends such as W6LDJ. Set up and demonstrated W9TCJ RTTY gear at Orange Coast College, Costa Mesa, Calif.—and hooked it up to the School Station K6AAJ and worked several RTTY contacts to the east. Everybody sure enjoyed seeing Ham RTTY in action, as they all had never seen it before. Next, to W6NRM QTH, Oxnard, California. Opened up our storage place and looked over things we have in storage there. Took out my Bud Cabinet with panels and put in car. Also visited Harold Stoner, K6BUD, and we set up W9TCJ/6 gear at his house and called and called until we were blue in our faces. Apparently that night nobody heard us. Anyhow, Harold called up Wayne Abern, W6 PYM, and after a few minutes we had a series of RTTY exchanges.

Then we reversed and started our trek home. After two days we reached Yuma, Colorado and visited WØBTV, as and then WØJRQ, in Denver, then on east to WØNME, next WØDW, and finally home—Williams Bay, Wisconsin. 4500 miles or more drive! All the RTTY equipment was none worse for the travel. The Model 26 worked FB all the time, in spite of rough roads some places. Adjusting screws must be tight! Hi!

Should be back on air in a couple of weeks or so."

—Bob, W9TCJ

———RYRYRY——

To all Radio Amateurs

ZL1WB advises that he copied W6FDJ, W6NKP and W6WIS on RTTY on 7150 kc. and has, therefore, ordered equipment and will be active from New Zealand on RTTY in the near future.

—Buck, W6VPC

"Buck asked me to send you copies of the RTTY broadcasts which I am temporarily putting out on Wednesday nites on 3625 kc. and 147.29 mc. at 8:00 p. m. Daylight Time. Buck will go back to making these broadcasts after the Convention. Speaking of the Convention, will be looking forward to seeing you there."

—73, Nick, W6FZC

———RYRYRY——

. . . . I think my contact on NFSK with VE3BAD constitutes another "first," similar to my first FSK contact recorded in your third issue of RTTY as the first FSK contact. VE3BAD was raised by my CQ call a few minutes after NSFK was authorized March 16th, and it was NFSK both ways.

Will rerun the tape again on the early conclusions on the Double-Doubler, which conclusions unfortunately still stand—de "Beep" WØBP.

Traffic Net News

By EMILE DUVAL, W6FLW

The RTTY Society of Southern California Net operates every Tuesday evening at 8:00 p. m. on 147.85 mc.

ACTIVITY FOR THE MONTH OF JULY, 1956

July 3—W6ADD, N. C.—12 Checkins

K6BTK	W6PFF
W6BWG	W6QHR
K6CHU	KN6QQV
W6CMQ	W6SCQ
W6IZJ	W6ZBV
W6LDG	W6ADD

July 10—W6IZJ, N. C.—22 Checkins

W6ADD	W6FLW
W6AEE	K6IHG
W6BPG	W6IOK
K6BPI	W6IZJ
K6BTK	W6KMT
W6CK	W6LDG
W6CMQ	W6OJF
W6CZ	P6PFF
W6DYB	W6SCQ
W6EV	W6ZBV
W6FBF	W6ZVO

July 17—W6IZJ, N. C.—24 Checkins

W6ADD	K6IHG
W6AEE	W6IZJ
W6BPG	W6JAU
K6BPI	K6JDN
K6BTK	W6LDG
W6CKS	W6MOY
W6CLW	W6OJF
W6CMQ	W6QHR
W6CZ	KN6QQV
W6DYB	W6SCQ
W6EV	W6VAD
W6FLW	W6ZBV

July 24—W6IZJ, N. C.—24 Checkins

W6ADD	W6FNW
W6AEE	K6IHG
W6BPG	W6IOF
K6BPI	W6IZJ
K6BTK	W6JAU
W6CK	K6JDN
W6CKS	W6LDG
W6CLW	W6OJF
W6DYB	KN6QQV
W6EV	W6SCQ
W6FBF	W6ZBV
W6FLW	W6ZVO

July 31—W6CMQ, N. C.—22 Checkins

W6ADD	W6FNW
W6AEE	K6IHG
W6BPG	W6IZJ
K6BPI	W6JAU
W6BWG	W6LDG
K6BWJ	W6MOY
W6CK	W6ORF
W6CMQ	K6OYK
W6CZ	W6SCQ
W6DYB	W6ZBV
W6FBF	W6ZVO